X-60

2573

Intra-Laboratory Correspondence

OAK RIDGE NATIONAL LABORATORY

OCT 13 1950

To: K. Z. Morgan

Date: 13 October 1950

From: H. J. McAlduff

Subject: Accidental Release of Radioargon into 105 Bldg. on October 12, 1950.

For a number of weeks radioargon has been released into the pile cooling air as part of a study being conducted by Dr. F. J. Davis' group on the Dispersal of Stack Gases. The system is described to some extent on an attached sheet entitled Operation of the Radioargon System for Release of Radioargon to the Atmosphere. Recently the mainfold system for releasing the gas at various rates began leaking while the valves were in the closed position. This was possibly due to a distortion of the brass needle valve from constant usage. The leakage presented no hazard from the standpoint of air activity in the 105 Bldg., but did result in a fairly high zone of radiation around the manifold system due to its being filled constantly with radioargon. It was decided to simplify the exhaust manifold system by having only one discharge line with a heavy duty stainless steel valve to be used for both shut off and throttling purposes. This work was completed on October 11, 1950.

On the morning of October 12th, the writer checked the system and filled the aluminum cylinder located within the reactor to a pressure of 500 lbs/in.^{2} with argon gas. All valves and settings were checked for leaks at this pressure using soap solution, and no leaks were detected. At this pressure the volume of gas contained within the aluminum cylinder was about 34 cu. ft. It was planned to irradiate this volume and release it to the atmosphere that afternoon.

At approximately 12:45 the writer received a telephone call from Mr. Pappas, Health Physics Surveyor at 105 Bldg. requesting that he come at once to the 105 Bldg. as the argon system had started leaking and that they had been forced to evacuate the building.

Upon arrival at the 105 Bldg. I immediately went to the second level south where the manifold was located to open the shut off valve and vent the gas to the atmosphere through the reactor vacuum lines, and discovered that this had accordingly been done. Due to the high level of radiation in the room containing the equipment the writer immediately left the building.

The original manifold utilized preset throttling valves which had been adjusted for various flow rates. Difficulties with the settings of these valves had been experienced however, and a rotometer had been installed in the line between the manifold and the 250 cc activity measuring chamber (refer to diagram on attached sheet). The connections to the rotometer were thick walled rubber tubing but no clamps had been used on these connections as previous runs had indicated that the pressure on the system at the rotometer was such that clamps were not considered necessary.

However, when the new stainless steel valve was installed, the release capacity of the valve was greater than the capacity of the rotometer. The rapid opening of this valve blew the rubber tubing off the end of the rotometer allowing the full contents of the aluminum chamber, the total activity of which was perhaps 150 to 200 curies, to be released into the pile building. Bldg. 105 was completely evacuated of personnel and all precautions necessary were observed. All doors and windows were opened and the natural ventilation of the building reduced the activity so that normal operations were resumed at 2:05 PM. The 105 Bldg. had been evacuated from 12:43 to 2:05. All necessary steps will be taken to redesign the exhaust manifold so that a reoccurrence of this regretable incident will be avoided.

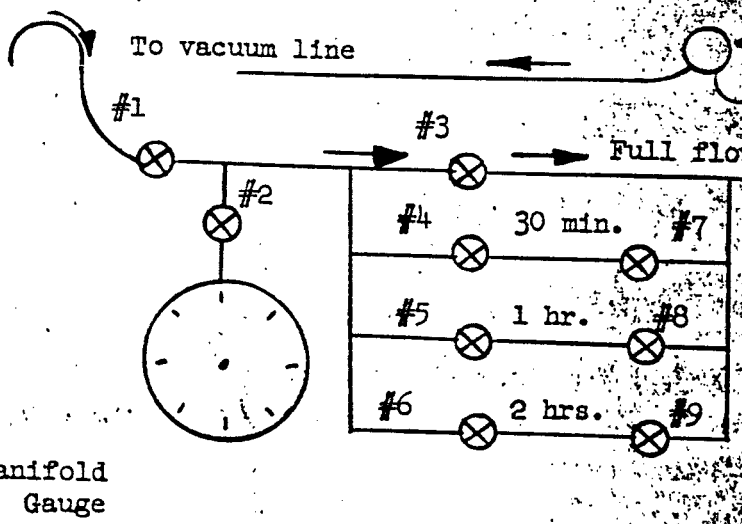
H. J. McAlduff
Health Physics Division

HJM:em

Copy to: F. Western
M. Ramsey
Jim Cox
Chas. Cagle

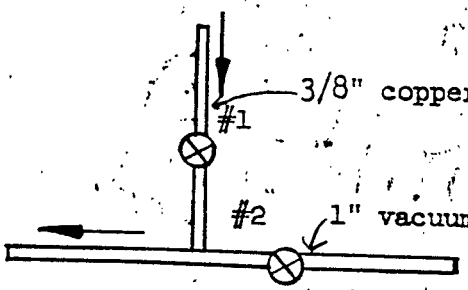
Operation of the Radioargon System for Release of Radioargon to the Atmosphere

The radioargon is contained in a long aluminum cylinder within the reactor in Stringer Hole #18. The aluminum cylinder is filled with argon using a standard high pressure cylinder of argon and a heavy duty reducing regulator, located on the north side of the reactor. The argon is released by means of a manifold located on the second level, south side of reactor, flows into a 250 cc brass chamber and is discharged back into the reactor cooling air through the bunny tunnel vacuum line. The manifold is an arrangement of valves allowing the choice of four different flow rates. The activity of the gas contained in the 250 cc brass chamber is measured at a distance of one meter with an electroscope, and these measurements indicate the curie content of the volume of gas released. The following sketch shows the detail of the manifold system.



Valve #1, Main shut-off valve. Always leave open.
Valve #2, Gauge Shut-off valve. Always leave open.
Valves #3, 4, 5, and 6-Selector Valves for various flow rates.
Valves #7, 8 and 9-Throttling valves, preset-no-adjustment necessary.

The valve arrangement for the discharge tube into the vacuum line is as follows:



Valve #1 - always open.

Valve #2 - This valve is closed when argon is being discharged - it is then opened and left opened upon completion of the run.

Note: These valves are located on the south side of the pile 1st level - lower left hand side of the mattress plate.